

REMARKS

This Response is offered in reply to Office Action mailed June 25, 2002.

In paragraph 2 of the action, claims 10-24 are rejected under 35 USC 103(a) in view of WO '973 taken with the Nazmy '442 patent.

This rejection is believed to be in error. The examiner acknowledges that WO '973 does not teach the use of a titanium aluminide alloy including a rare earth element in an amount effective to prolong resistance to attack of the alloy by molten material comprising aluminum.

Applicants agree and note that nowhere in WO '973 is there any disclosure or suggestion of a method of increasing the service life of a titanium aluminide alloy in contact with a molten material comprising aluminum by including in the titanium aluminide alloy a rare earth element in an effective amount to prolong resistance to attack of the alloy by the molten material.

Applicants refer the examiner to page 4 of the specification where the resistance of different specimens to attack by molten aluminum at 700 degrees C is described and shown in the TABLE. The TABLE reveals that resistance to attack was increased by more than 2 times for the titanium aluminide alloy including 1.5 weight % Y pursuant to the invention as compared to the titanium alloy without Y (i.e. 0 weight % Y) representative of WO '973.

The TABLE also reveals that resistance to attack was increased by more than 4 times for the titanium aluminide alloy including 5.0 weight % Y pursuant to the invention as compared to the titanium alloy without Y (i.e. 0 weight % Y) representative of WO '973.

The WO '973 document provides no disclosure or suggestion whatsoever that such resistance to attack can be so dramatically prolonged by including a rare earth element in a titanium aluminide alloy.

The examiner cites the Nazmy '442 patent as disclosing a gamma Ti-Al alloy intended for machine components and as allegedly teaching that certain alloying additions, such as Y, provide excellent hardness and strength at high temperatures. The examiner argues that it would have been obvious to add Y to WO '973 to provide excellent hardness and strength at high temperatures.

Applicants disagree with the combination of the '442 patent with WO '973 to reject Applicants' claims. For example, as pointed out above, WO '973 makes no disclosure or suggestion to include a rare earth element for any purpose. The '442 patent nowhere discloses contacting the Ti-Al alloy with molten material comprising aluminum or any way of increasing resistance of the alloy to attack by such molten material.

In contrast, Applicants claims 10-15, 18, and 20 recite a method of increasing the service life of a titanium aluminide alloy to such molten material by including in the titanium aluminide alloy a rare earth element in an effective amount to prolong resistance to attack of the alloy by the molten material. As pointed out above, Applicants' TABLE on page 4 of their specification shows dramatic prolongation of the resistance of the titanium aluminide alloy to molten aluminum not disclosed or suggested in the '442 patent.

The '442 patent does not disclose or suggest contacting the alloy with molten material comprising aluminum or that any of the numerous additions referred to by the examiner would have an effect of any kind on the alloy with respect to attack by such molten material. How then can it be obvious to include a rare earth element in WO '973 to arrive at Applicants' claimed method? Moreover, how would it be obvious to pick a rare earth element from among the numerous additive elements listed in the '442 patent to arrive at Applicants' claimed method? Applicants believe the rejection amounts to a prohibited hindsight analysis of claims 10-24.

Applicants' claims 10-15, 18, and 20 recite a method of increasing the service life of a titanium aluminide alloy in contact with a molten material comprising aluminum that is nowhere disclosed or suggested in either cited document alone or when taken together.

With respect to independent claim 21, neither WO '973 nor the '442 patent discloses or suggests die casting a molten material comprising aluminum in the manner set forth to prolong resistance to attack of one or more of a die, shot sleeve, and plunger by such molten material. The '442 patent does not suggest that any of the numerous additions referred to by the examiner, including Y, would have an effect of any kind on the alloy with respect to attack by such molten material in a die casting method.

With respect to claims 12 and 22-24, the '442 patent does not disclose or suggest contacting the alloy with molten material comprising aluminum or that any of the numerous the additions referred to by the examiner, including Y, would have an effect of any kind on the alloy with respect to attack by such molten material. How can it be obvious to include a rare earth element in WO '973 from the numerous additive elements listed in the '442 patent to arrive at Applicants' claimed method?

With respect to claim 16, the examiner acknowledges that WO '973 does not teach reheating the titanium alloy to form a surface oxide. However, without any express support in WO '973 or the '442 patent, the examiner indicates that the multiple steps of claim 16 are prima facie obvious. This is believed to be patently in error. Neither the WO '973 nor the '442 patent discloses or suggests a method of prolonging resistance of a titanium aluminide alloy to a molten material comprising aluminum by the steps set forth in claim 16 wherein the alloy is contacted for a time with the molten material, the alloy is removed from contact with the molten material, the alloy is heated in an oxygen-bearing atmosphere at elevated superambient temperature to form a surface oxide

thereon, and the alloy having the surface film thereon is re-contacted with the molten material. The examiner's rejection based on WO'973 amounts to a prohibited hindsight analysis of claim 16.

With respect to claims 18-20, the '442 patent does not disclose or suggest contacting the alloy with molten material comprising aluminum or that any of the numerous the additions referred to by the examiner, including Y, would have an effect of any kind on the alloy with respect to attack by such molten material. As the examiner acknowledges, WO '973 is utterly silent with respect to including a rare earth element in the titanium aluminide alloy to prolong resistance of the alloy to a molten material comprising aluminum.

In paragraph 3 of the office action, claims 10-15 and 21-24 are rejected under the judicially created doctrine of obviousness type double patenting in view of claims 1-14 of US Patent 6 238 195 in view of the '442 patent.

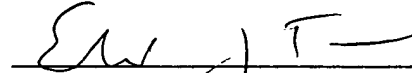
The examiner acknowledges that the '195 patent does not teach the use of a titanium aluminide alloy including a rare earth element in an amount effective to prolong resistance to attack of the alloy by molten material comprising aluminum. The examiner's citation of the '442 patent to make up for this gross deficiency of the '195 patent is in error for the reasons set forth above. The '442 patent does not disclose or suggest contacting the alloy with molten material comprising aluminum or that any of the numerous the additions referred to by the examiner would have an effect of any kind on the alloy with respect to attack by such molten material.

Applicants' Table on page 4 of their specification shows dramatic prolongation of the resistance of a titanium aluminide alloy to molten aluminum not disclosed or suggested by either the '195 patent or the '442 patent. Where in either cited reference is such an improvement even remotely suggested?

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Claims 10-24 are believed to be allowable, and action to that end is requested.

Respectfully submitted,



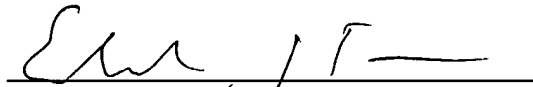
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I hereby certify that this correspondence and enclosures are being deposited with the United States Postal Service under 37 CFR 1.8 as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on September 25, 2002.

  
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